



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,000	04/26/2001	Toru Otsubo	503.39737X00	7052

20457 7590 12/27/2005

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

CROWELL, ANNA M

ART UNIT	PAPER NUMBER
----------	--------------

1763

DATE MAILED: 12/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,000

Applicant(s)

OTSUBO, TORU

Examiner

Michelle Crowell

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-11 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 9-11 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09/05.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-8 are cancelled. Claims 9-11 are pending in the application. Claims 9-11 stand finally rejected.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claims 9 and 10 recite the limitation "plate **type** electrode". The addition of the word "type" to an otherwise definite expression extends the scope of the expression so as to render it indefinite (Ex parte Copenhaver, 109 USPQ 118 (Bd. App. 1955)).
4. Claim 10 recites the limitation "a control unit for maintaining the facing plate type electrode separated from the ground and for enabling setting of an impedance between the mutually isolated conductors and ground independently during processing of the substrate" which is vague. Since the claimed language is different from the specification's language, a clear structural definition should be cited from the specification for the claimed function. For example from the applicant's specification, what structure maintains the facing plate type electrode separated from ground, and what structure enables setting of an impedance between the mutually isolated conductors and ground independently. Additionally, it is unclear how the

Art Unit: 1763

facing plate type electrode separated from ground and at the same time, the impedance is set between the conductors of the facing plate electrode and the ground.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsubo et al. (Japanese Patent Publication 11-260596) in view of Sato et al. (U.S. 5,907,221).

Referring to Drawing 1 and 16, and paragraphs [0113]-[0130], Otsubo et al. discloses a plasma processing apparatus comprising a plasma processing gas supply unit, an exhaust air unit [0114], plasma generating unit; and a control unit; wherein the plasma generating unit comprises: a capacitively coupled plasma generating device which includes an opposed plate type electrode consisting of a plurality of ring shaped mutually isolated conductors (counterelectrodes 71a 71b 71c) [0115] oppositely disposed with respect to a stage electrode 52 [0129]; an electromagnetic wave radiation plasma generating device includes ring shaped insulators 80a 80b 80c disposed between the plurality of mutually isolated conductors 71a 71b 71c and arranged so that an electromagnetic wave is radiated from each of positions between the plurality of isolated conductors; wherein the control unit comprises: a distribution controlling unit for controlling distribution of electromagnetic wave radiation during plasma processing so as to enable control of plasma distribution as a convex/concave distribution by controlling said electromagnetic

Art Unit: 1763

wave radiation (last 8 lines of par. [0133]); and a setting unit for setting processing conditions of the substrate (par. [0114], [0123], [0128], last 4 lines of par. [0133]); and a monitor unit for monitoring the progress of plasma processing in said plasma process chamber whereby said control unit controls said distribution of electromagnetic wave radiation during plasma processing of said substrate. With respect to monitor unit, it is implicit that a monitoring unit is used in the apparatus of Otsubo et al. since controlling various parameters (i.e. power, pressure, gas flow, electron temperature) have been discussed. For example, in order to control various processing parameters such as electron temperature (par.[0131]), a device for monitoring the changes in electron temperature is used first. Then, the information from the monitor is sent to the controller and finally the controller determines whether to change the processing conditions based on the monitoring information.

Additionally, a high-frequency voltage 81 and 82, whose phase can be shifted by a capacitor 83, is supplied to the isolated conductors 71, thereby generating electromagnetic waves. The power of electromagnetic waves radiates through the insulators and isolated conductors. A resonant circuit is formed via the insulators 80 and the capacitor 83. The signal generator 97 controls the phase of the high-frequency signal [0130]. Alternately, the electromagnetic waves can be generated by antenna 11 [0041].

Furthermore, the distribution of the plasma density can be controlled by controlling the radiated electromagnetic waves based on the adjustment of the phase of the high-frequency voltage supplied to the isolated conductors 71. Moreover, the distribution of the plasma density due to capacitive coupled plasma can be controlled by controlling the outputs of the high frequency power supplies 81 and 82 [0131].

Art Unit: 1763

Otsubo et al. fails to teach a single commonly shared high-frequency power supply device.

Referring to Figure 7, column 3, lines 49-53, column 4, lines 27-37, Sato et al. teaches a plasma processing apparatus using a single commonly shared high-frequency power supply device 170 (Fig. 6, col. 4, lines 14-15) to power a plurality of isolated conductors 150a'-k' since it has the advantage of simplicity and cost effectiveness. Additionally, power controller 180 controls the power. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the high frequency power supply means of Otsubo et al. to have a single commonly shared high-frequency power supply means as taught by Sato et al. since it is a simple and cost effective means to power a plurality of isolated conductors.

Response to Arguments

Applicant's arguments filed September 30, 2005 have been fully considered but they are not persuasive.

Applicant has argued that Otsubo et al. fail to teach a control unit for controlling distribution, for setting process conditions, and for monitoring the progress of plasma. However, as stated above and in paragraph [0133], Otsubo et al. specifically teach that by controlling the electromagnetic wave radiation, the plasma distribution can have a convex/concave distribution. Additionally, throughout the specification (par. [0114], [0123], [0128], last 4 lines of par. [0133]), Otsubo et al. specifically teach controlling the processing conditions to yield the desired substrate. Furthermore, it is conventionally known in the art that when using a controller some sort

Art Unit: 1763

of monitoring device must be used so that data can be inputted into the controller (see last 7 lines of par. 6 of office action). Thus, Otsubo et al. teach the claimed requirement.

Applicant has argued that Otsubo et al. fail to teach a single commonly shared high-frequency device; however, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, the combination of Otsubo et al. in view of Sato et al. teach a single commonly shared high-frequency power device 170 that uses a power controller 180 to control the power to the plurality of conductors 150'a-150'k (Sato et al., Fig. 6, col. 4, lines 14-21). Moreover, the motivation to use a single commonly shared high-frequency device is for the advantage of simplicity and cost effectiveness. Thus, the combination of Otsubo et al. in view of Sato et al. teaches the claimed requirement.

Applicant has argued that Otsubo et al. fails to control the power, to maintain electrodes separated from ground, and to enable setting of an impedance between the conductors and ground; however, as stated above, both Otsubo et al. and Sato et al. teach controlling the power. With respect to maintaining the electrodes separated from ground, and to enabling setting of an impedance between the conductors and ground, paragraph 4 of the office action indicates that the limitation is indefinite.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

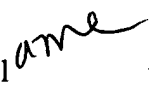
Art Unit: 1763


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:30 -6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michelle Crowell 
Patent Examiner
Art Unit 1763


Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763